CLAIMS

1. In a system for convectively controlling a temperature with an inflatable thermal device, a combination for monitoring a condition between an air hose and an inlet port in the inflatable thermal device, comprising:

an inlet port of an inflatable device including an annular first circuit element; and

a second circuit element near a first end of an air hose receivable in the inlet port, the second circuit element cooperating with the first circuit element to enable a signal representing a connection between the first end of the air hose and the inlet port, independent of the rotational alignment of the air hose in the inlet port.

2. The combination of claim 1 in which the second circuit element includes an electrical contact;

in which the first circuit element includes an electrical contact forming a conductive link with second circuit element electrical contact.

3. The combination of claim 2 in which the first circuit element includes a hose card with a plurality of deformable members, gradually stiffening to capture an air hose inserted into the inlet port.

4. The combination of claim 3 in which the first circuit element deformable members have a surface coated with a conductive ink.

5. The combination of claim 4 in which the conductive ink includes conductive elements selected from the group of graphite, copper, silver, and carbon.

6. The combination of claim 4 in which the conductive ink is manufactured by Acheson, part number SS 24600.

7. The combination of claim 4 in which the second circuit element electrical contact is formed in an annular groove around the outside surface of the first air hose end to capture the first circuit element gradually stiffening members.

8. The combination of claim 2 in which first end of the air hose is a highly resistive polymer and the second circuit element electrical contact is formed from a highly conductive element underlying the surface of the polymer air hose first end, the first and second circuit elements cooperating to enable a signal between the first circuit element and the polymer hose surface immediately overlying the highly conductive element.

9. The combination of claim 2 in which the first circuit element has a first impedance, in which the second circuit element has a second impedance, the first and second circuit elements cooperating to provide an impedance which represents a connection between the first end of the hose and the inlet port.

10. In a system for convectively controlling a temperature with an inflatable thermal device, a combination for controlling airflow between an air hose and an inlet port in the inflatable thermal device, comprising:

an inlet port of an inflatable device; and

a valve near a first end of an air hose receivable in the inlet port, the valve cooperating with the inlet port to enable airflow between the first end of the air hose and the inlet port.

11. The combination of claim 10 in which the valve cooperates with the inlet port independent of the rotational alignment of the air hose in the inlet port.

12. The combination of claim 10 in which the valve includes a flap having a diameter substantially the same as the air hose diameter to block the flow of air when the air hose is not received in the inlet port.

13. The combination of claim 12 in which the valve includes a hinge lever, the hinge lever cooperating with the inlet port to prevent the flap from blocking the flow of air when the air hose is received in the inlet port.

14. The combination of claim 12 valve includes seating cams, the seating cams cooperating with the inlet port to prevent the flap from blocking the flow of air when the air hose is received in the inlet port.

15. The combination of claim 12 in which the air hose includes a first magnet, in which the valve flap includes a second magnet, the first magnet cooperating with the second magnet so that the flap blocks the flow of air when the air hose is not received in the inlet port.

16. The combination of claim 12 in which the air hose includes a gear rack mounted lever cooperating with the inlet port to prevent the flap from blocking the flow of air when the air hose is received in the inlet port.

17. In a system for convectively controlling a temperature with an inflatable thermal device, a combination for monitoring a condition between an air hose and an inlet port in the inflatable thermal device, comprising:

a first circuit element at an inlet port of an inflatable device connected to an electronic identification tag to identify the inflatable device; and

a second circuit element near a first end of an air hose receivable in the inlet port, the second circuit element cooperating with the first circuit element to enable an identification signal representing a connection between the first end of the air hose and the inlet port.

18. The combination of claim 17 in which the first circuit element includes an electrical contact; and

in which the second circuit element includes an electrical contact, cooperating with the electrical contact of first circuit element by forming a direct connection to enable the identification signal.

19. The combination of claim 17 in which the first circuit element includes a radiating element;

in which the second circuit includes a radiating element, the second circuit cooperating with the first circuit element by coupling signals between the second circuit element radiator and the first circuit element radiator.

20. The combination of claim 17 in which the electronic identification tag provides a 1-bit identification code.

21. The combination of claim 17 in which the electronic identification tag provides a 64-bit identification code.

22. The combination of claim 21 in which the 64-bit identification provides information including the inflatable thermal device model number, the inflatable thermal device serial number, the preferred air flow rate, the preferred air

temperature, and patient identification.

23. The combination of claim 17 in which the first circuit element includes a power supply connected to the electronic identification tag.

24. The combination of claim 17 in which second circuit element is connected to a power supply, and in which the second circuit element cooperates with the first circuit element to power the electronic identification tag with the power supply.

25. An inflatable thermal device system, comprising:

an inflatable thermal device with at least one inlet port and at least one surface adapted to expel air;

an air hose with a first end and a second end;

an inlet port of an inflatable device including an annular first circuit element;

a second circuit element near a first end of an air hose receivable in the inlet port, the second circuit element cooperating with the first circuit element to enable a signal representing a connection between the first end of the air hose and the inlet port independent of the alignment of the air hose in the inlet port; and

one or more conductors in the air hose connected to the second circuit element for conducting the signal from the first to the second end.

26. The device of claim 25 in which the second circuit element includes an electrical contact;

in which the first circuit element includes an electrical contact, forming a conductive link with the second circuit element electrical contact.

27. The device of claim 26 in which the first circuit element includes a

hose card with a plurality of deformable members, gradually stiffening to capture an air hose inserted into the inlet port.

28. The device of claim 27 the first circuit element deformable members have a surface coated with a conductive ink.

29. The device of claim 28 in which the conductive ink includes conductive elements selected from the group of graphite, copper, silver, and carbon.

30. The device of claim 28 in which the conductive ink is manufactured by Acheson, part number SS 24600.

31. The device of claim 28 in which the second circuit element electrical contact is formed in an annular groove around the outside surface of the first air hose end to capture the first circuit element gradually stiffening members.

32. The device of claim 26 in which first end of the air hose is highly resistive polymer and the second circuit element electrical contact is formed from a highly conductive element underlying the surface of the polymer air hose first end, the first and second circuit elements cooperating to enable a signal between the first circuit element and the polymer hose surface immediately overlying the highly conductive element.

33. The device of claim 26 in which the first circuit element has a first impedance, in which the second circuit element has a second impedance, the first and second circuit elements cooperating to provide an impedance which represents a connection between the first end of the hose and the inlet port.

34. An inflatable thermal device system, comprising:

an inflatable thermal device with at least one inlet port and at least one surface adapted to expel air;

an air hose with a first end and a second end;

a valve near the first end of an air hose receivable in the inlet port, the valve cooperating with the inlet port to enable airflow between the first end of the air hose and the inlet port.

35. The device of claim 34 in which the valve cooperates with the inlet port independent of the rotational alignment of the air hose first end in the inlet port.

36. The device of claim 34 in which the air hose has a first diameter; and

in which the valve includes a flap with the first diameter to block the flow of air when the air hose first end is not received in the inlet port.

37. The device of claim 36 in which the valve includes a hinge lever, the hinge lever cooperating with the inlet port to prevent the flap from blocking the flow of air when the air hose first end is received in the inlet port.

38. The device of claim 36 valve includes seating cams, the seating cams cooperating with the inlet port to prevent the flap from blocking the flow of air when the air hose first end is received in the inlet port.

39. The device of claim 36 in which the air hose includes a first magnet, in which the valve flap includes a second magnet, the first magnet cooperating with the second magnet so that the flap blocks the flow of air when the air hose is not received in the inlet port.

40. The device of claim 36 in which the air hose includes a gear rack mounted lever cooperating with the inlet port to prevent the flap from blocking the flow of air when the air hose is received in the inlet port.

41. An inflatable thermal device system, comprising:

an inflatable thermal device with at least one inlet port and at least one surface adapted to expel air;

an air hose with a first end and a second end;

a first circuit element at an inlet port of an inflatable device connected to an electronic identification tag to identify the inflatable device; and

a second circuit element near a first end of an air hose receivable in the inlet port, the second circuit element cooperating with the first circuit element to enable an identification signal representing a connection between the first end of the air hose and the inlet port; and

one or more conductors in the air hose connected to the second circuit element for conducting the signal from the first to the second end.

42. The device of claim 41 in which the first circuit element includes an electrical contact; and

in which the second circuit element includes an electrical contact, the second circuit cooperating with the first circuit element by making direct connection between the electrical contacts of the first circuit element and the second circuit element.

43. The device of claim 41 in which the first circuit element includes a radiating element;

in which the second circuit includes a radiating element, the second circuit cooperating with the first circuit element by coupling signals between the second circuit element radiator and the first circuit element radiator.

44. The device of claim 41 in which the electronic identification tag provides a 1-bit identification code.

45. The device of claim 41 in which the electronic identification tag provides a 64-bit identification code.

46. The device of claim 45 in which the 64-bit identification provides information including the inflatable thermal device model number, the inflatable thermal device serial number, the preferred air flow rate, the preferred air temperature, and patient identification.

47. The device of claim 41 in which the first circuit element includes a power supply connected to the electronic identification tag.

48. The device of claim 41 in which second circuit element is connected to a power supply, and in which the second circuit element cooperates with the first circuit element to power the electronic identification tag with the power supply.

49. A method for indicating a condition in a system including an inflatable thermal device with at least one annular inlet port, at least one surface adapted to expel air, and an air hose with two ends for delivering a flow of pressurized air to the inflatable thermal device when one end is coupled to the inlet port, comprising:

inserting an end of the air hose into the inlet port of the inflatable thermal device;

operating the inflatable thermal device by conducting a flow of pressurized air through the air hose;

independent of the rotational alignment of the air hose in the inlet port, sensing at the inlet port a condition between the inlet port and the end of the air hose; and

responding to the sensed condition.

50. The method of claim 49 in which the sensing of a condition at the inlet port includes forming an electrical connection between the inlet port and the end of the hose.

51. The method of claim 50 wherein the inlet port is formed in a hose card having a plurality of deformable members; and

in which the insertion of the air hose into the inlet port includes the hose card members gradually stiffening to capture the air hose as the air hose is inserted into the inlet port.

52. The method of claim 51 wherein the hose card gradually stiffening members have a surface coated with a conductive ink; and

in which the sensing of a condition at the inlet port includes forming an electrical connection across the hose card ink surface.

53. The method of claim 52 wherein the conductive ink includes conductive elements selected from the group of graphite, copper, silver, and carbon.

54. The method of claim 52 in which the conductive ink is manufactured by Acheson, part number SS 24600.

55. The method of claim 52 wherein the air hose end includes an electrical

contact formed in an annular groove around the outside surface;

in which the insertion of the air hose into the inlet port includes capturing the deformed hose card members in the annular groove; and

in which the sensing of the condition at the inlet port includes forming an electrical connection between the electrical contact in the annular groove of the air hose end and the hose card conductive ink.

56. The method of claim 50 wherein the second circuit element electrical contact is formed from a highly conductive element underlying the surface of the air hose first end made from a high resistivity polymer; and

in which the sensing of the condition at the inlet port includes forming an electrical connection between the highly resistive polymer surface overlying the highly conductive element and the first circuit element.

57. The method of claim 50 wherein the first circuit element has a first resistance and the second circuit element has a second resistance; and

in which the sensing of the condition at the inlet port includes measuring the impedance of the electrical connection formed by the first and second circuit elements.

58. The method of claim 57 in which the response to the measuring of the impedance formed by the connection of the first and second circuit elements includes delivering air in accordance with a set of parameters which are responsive to the measured impedance.

59. The method of claim 50 in which the response to the sensed condition includes delivering pressurized air in accordance with a first set of parameters when an electrical connection is made between the inlet port and the air hose end, and

delivering air in accordance with a second set of parameters when no electrical connection is made between the inlet port and the air hose end.

60. A method for controlling air flow in a system including an inflatable thermal device with at least one inlet port, at least one surface adapted to expel air, an air hose having two ends, and a valve to prevent the delivery of a flow of pressurized air to the inflatable thermal device, comprising:

inserting an end of the air hose into the inlet port of the inflatable thermal device;

in response to inserting the air hose into the inlet port, opening the valve; and

operating the inflatable thermal device by conducting a flow of pressurized air through the air hose;

61. The method of claim 60 in which opening of the valve includes the valve cooperating with the inlet port.

62. The method of claim 61 wherein the valve includes a flap having a diameter substantially the same as the air hose diameter, the method further comprising:

blocking the flow of air with the valve flap when the air hose is not received in the inlet port.

63. The method of claim 62 wherein the valve includes a hinge lever; and

in which the opening of the valve includes the hinge lever cooperating with the inlet port to prevent the flap from blocking the flow of air when the air hose is received in the inlet port.

64. The method of claim 62 wherein the valve includes seating cams; and

in which the opening of the valve includes the seating cams cooperating with the inlet port acting to prevent the flap from blocking the flow of air when the air hose is received in the inlet port.

65. The method of claim 62 wherein the air hose includes a first magnet and the valve flap includes a second magnet; and

in which the blocking of the air flow includes the first magnet cooperating with the second magnet, positioning the flap to prevent the flow of air when the air hose is not received in the inlet port.

66. The method of claim 62 wherein the air hose includes a gear rack mounted lever; and

in which the opening of the valve includes the gear rack mounted lever cooperating with the inlet port acting to prevent the flap from blocking the flow of air when the air hose is received in the inlet port.

67. The method of claim 62 in which the insertion the insertion of the air hose end into the inlet port of the inflatable thermal device includes making an electrical connection; and

in which the operation of the inflatable thermal device includes delivering a pressurized flow of air in accordance with parameters which are selected in response to making the electrical connection.

68. A method for indicating a condition in a system including an inflatable thermal device with at least one inlet port having an electronic identification tag, at least one surface adapted to expel air, and an air hose with two ends for delivering a flow of pressurized air to the inflatable thermal device when one end is coupled to the inlet port, comprising:

inserting an end of the air hose into the inlet port of the inflatable thermal device;

communicating with the electronic identification tag;

identifying the inflatable device at the inlet port; and

in response to identifying the inflatable thermal device, operating the inflatable thermal device by conducting a flow of pressurized air through the air hose.

69. The method of claim 68 wherein the inlet port includes an electrical contact, and wherein the air hose end includes an electrical contact; and

in which communication with the electronic identification tag includes completing a direct connection between the inlet port contact and the air hose end contact.

70. The method of claim 68 wherein the inlet port includes a radiating element, and wherein the air hose end includes a radiating element; and

in which communication with the electronic identification tag includes coupling signals between the inlet port radiating element and the air hose end radiating element.

71. The method of claim 68 wherein the electronic identification tag provides a 1-bit identification code; and

in which communication with the electronic identification tag includes communicating the 1-bit identification code.

72. The method of claim 68 wherein the electronic identification tag provides a 64-bit identification code; and

in which communication with the electronic identification tag includes communicating the 64-bit identification code.

73. The method of claim 72 in which the communication of the 64-bit identification code includes communicating information including the inflatable thermal device model number, the inflatable device serial number, the preferred air flow rate, the preferred air temperature, and the identification of the patient.

74. The method of claim 68 wherein the inflatable device includes a power supply connected to the electronic identification tag; and

in which communication with the electronic identification tag includes powering the electronic identification tag with the power supply.

75. The method of claim 68 wherein the air hose includes a connection to a power supply; and

in which communication with the electronic identification tag includes connecting the air hose to the inlet port to provide power to the electronic identification tag.

76. The method of claim 68 in which the operation of the inflatable thermal device includes delivering a flow of pressurized air through the air hose in accordance with a plurality selectable parameters, and in which the operating parameters are selected in response to the identity of the inflatable device.